Pigmented basal cell carcinoma in an old man treated with surgical excision and flap reconstruction: a case report

Berliana Kurniawati Nur Huda¹, Rahmadewi¹*, Muhammad Yulianto Listiawan¹, Bagus Haryo Kusumaputra¹, Irmadita Citrashanty⁷, Maylita Sari¹, Ditya Indrawati¹, Ira Yunita¹

ABSTRACT

Background: Basal cell carcinoma (BCC) stands as the prevailing form of malignancy, and its prevalence is on the rise. While BCC carries a minimal risk of mortality, it can induce notable morbidity, chiefly due to localized damage. The incidence of BCC increases significantly after the age of 40 years, especially in women who are caused by exposure to ultraviolet (UV) rays. There are a variety of surgical and non-surgical treatments for BCC. In general, surgical methods are used more frequently because of their higher cure rates. We are reporting a case of pigmented basal cell carcinoma in an old Asian man who was treated with surgical excision with wound reconstruction using flap surgery.

Case Report: A 70-year-old man sought consultation at the Dermatology and Venereology outpatient clinic of Dr. Soetomo Regional Public Hospital. His main complaint was a wound on his forehead from two years ago. Initially, it appeared as a small lump with skin color. Over time, the lump got bigger and then turned into a wound that got wider. He also felt pain and itch on the wound. For the past year, the wound had become easily bleeding. Dermatological examination revealed an ulcer with a clean base, not sharply marginated, asymmetry, and a size of 1.8 x 1.6 cm, with a rolled-up margin and an elevated edge. There was a translucent hyperpigmented nodule on the edges and a sign of bleeding in the center of the ulcer.

A dermoscopy examination showed a blue-gray ovoid nest, shiny white structureless area, arborizing vessels, and ulceration. Histopathological results from both biopsies showed the proliferation of anaplastic basal cells was a monotonous rounded nucleus, coarse chromatin, several prominent nuclei, and narrow cytoplasm to moderately that partially contained melanin.

Case Discussion: The patient was diagnosed with Pigmented BCC. The treatment plan was to use surgical excision with advancement flap reconstruction. Postoperative lesions showed improvement and healed after three weeks post-surgery.

Conclusion: The management of BCC is determined based on the anatomical location and histological features. Widely used therapeutic approaches such as standard excision surgery or other invasive methods are significant therapeutic options.

Keywords: Basal cell carcinoma, surgical excision, advancement flap, forehead reconstruction, cancer, human and health.

INTRODUCTION

Basal Cell Carcinoma (BCC) denotes malignant neoplasms originating from basal cells situated in the inter-follicular epidermis or hair follicles. The occurrence of BCC adds to the escalating global cancer burden, with an estimated 1 in 5 males and 1 in 6 females anticipated to experience some form of cancer in their lifetime. Despite imprecise reporting of BCC cases, its global prevalence is on the ascent, impacting around one million new patients annually. It stands as one of the prevalent forms of skin cancer, notably among the Caucasian population.¹ The incidence of BCC correlates inversely with a country’s geographic latitude and the pigmentation of its residents. Consequently, similar incidence rates have been observed in Europe, Canada, and Asia, with Australia registering the highest incidence globally. Despite a seeming plateau in the incidence trend in Australia, other continents, including Asia and South America, continue to witness a persistent increase in BCC rates.²

BCC exhibits low fatality rates but can induce substantial morbidity, primarily via localized damage.³ BCC lesions predominantly emerge on sun-exposed regions of individuals with lighter skin tones. Its occurrence is infrequent in darker skin tones due to the inherent photoprotective properties of melanin and melanosomal dispersion. The predominant site for the vast majority of BCCs is the head and neck, particularly affecting the nose, cheek, or forehead.⁴

The primary focus of BCC treatment revolves around local control due to its limited metastatic potential. When comparing cure rates across diverse studies, various factors should be taken into account, such as follow-up duration and the proportion of high-risk and recurrent tumors. Surgical intervention serves as the mainstay for treating BCC, allowing for the complete excision of the tumor mass.
while preserving cosmetic and functional aspects, thereby optimizing outcomes for the patient. Options encompass standard surgical excision, destruction through various physical modalities, Mohs micrographic surgery (MMS), and topical chemotherapy. According to the Cochrane Collaboration, surgery and radiotherapy emerge as the most effective treatments for BCC, with surgery yielding the best overall results.\textsuperscript{1,3,4} In this instance, we present a case of pigmented basal cell carcinoma managed through surgical excision with round reconstruction utilizing flap surgery.

**CASE REPORT**

On the 23\textsuperscript{rd} of February 2022, a 70-year-old man sought consultation at the Dermatology and Venereology outpatient clinic of Dr. Soetomo Regional Public Hospital. His main complaint was a wound on his forehead from two years ago. Initially, it appeared as a small lump with skin color. Over time, the lump got bigger and then turned into a wound that got wider. Some of the lumps appeared as black lumps. According to the patient, the wound never healed, even though it was given any kind of medicine. His complaint was also accompanied by pain and itch on the wound. For the past year, the wound has become easily bleed, especially if it was accidentally rubbed by the patient’s hand. Complaints of previous lumps in the forehead area before the last two years were denied. The history of lumps in other areas of the body was denied. He has been a farmer since his 20s (until now), and he often goes outdoors for more than two hours/day without any sun protection. There was a history of smearing medicine from a general practitioner and dermatologist from BDH hospital (wet dressing with normal saline, antibiotic cream, Cefixime 2x100mg, and Mefenamic acid 3x500mg), but there was no improvement. The same complaint in other body parts was denied. Furthermore, there was no history of hypertension or diabetes mellitus, no reported food or drug allergies, and no family history of any cancer types. The patient also denied using oil on the wound.

Upon the physical examination, the patient demonstrated a satisfactory general condition and was comos mentis, with a blood pressure of 120/70 mmHg, a heart rate of 86 beats per minute, a respiratory rate of 18 breaths per minute, and a temperature of 36.4°C. A general head and neck examination showed there is no anemia, icterus, cyanosis, or dyspnea. On examination of the heart, the heart sound ($S_1$ and $S_2$) was single regular. There were no murmurs and gallops. Vesicular breath sounds. There was no rhonchi or wheezing. On abdominal examination, there was no abdominal distention, and the liver and spleen were not palpable. The extremities felt warm, and no edema. Enlargement of regional lymph nodes cannot be found. The patient weighed 60 kg, and his height measured 165 cm.

Based on the dermatological status of the frontalis region showed an ulcer with a clean base above the right eyebrow, not sharply margined, asymmetry, and 1.8 x 1.6 cm in diameter, with a rolled-up margin and elevated edge. A translucent hyperpigmented nodule appeared on one of the edges, and there was a sign of...
bleeding in the center of the ulcer (Figure 1). A dermoscopic evaluation revealed a blue-gray ovoid nest (blue arrow), shiny white structureless area (yellow star), arborizing vessels (black triangle), and ulceration (white arrow) (Figure 2).

From the patient’s history, physical examination, and dermoscopy examination, we assessed this patient as a suspected BCC. To confirm the clinical diagnosis through histopathology examination, we did a punch biopsy from the lesion.

The histopathology examination from the punch biopsy showed a skin biopsy sample that is layered with the epidermis. In the dermis, there is a tumor growth consisting of a proliferation of anaplastic basaloid cells with oval, monotonous, hyperchromatic, and narrow cytoplasm. At the edges, the cells are arranged with a palisading pattern. From the explanation above, the conclusion was BCC (Figure 3).

After the first histopathology result, we assessed the patient with BCC. The planning diagnosis for the patient was a laboratory examination and surgical excision combined with a bilateral advancement flap (A-T Plasty) and a second histopathology examination from the lesion to observe the margin of the malignant cells. The laboratory result was within normal limits. Hemoglobin 13.2 g/dl, total count of white blood cell (WBC) 7.08 x 10³/μL, platelets 312 x 10³/μL, serum creatinine 0.76 mg/dL, BUN 9 mg/dL, SGOT 22 U/L, SGPT 21 U/L, sodium 143 mmol/l, Kalium 5 mmol/l, Chloride 102 mmol/l, PPT 14.2 second, APTT 33.4 second, blood glucose 115 g/dl, HbsAg, anti-HIV and swab PCR COVID-19 were negative.

Before the surgery was performed, the patient was given premedication using Cefazoline 2 gram intravenous (IV) 1 hour prior to the surgery. The surgical excision was done with tumescent anesthesia; an excision with a 5 mm margin was made from the edge of the tumor. The reconstruction for the excised area was done using a bilateral advancement flap with A-T Plasty, considering the aesthetic unit from the forehead (Figure 4). The surgical margin from the edge of the lesion was 5 mm. After the surgical excision, we did the second histopathology to confirm the tumor margin of the lesion.

Figure 5. Second histopathology result after surgical excision. (A). Histopathology result magnification 10X; (B). Histopathology result magnification 40X showed a monotonous rounded nucleus, coarse chromatin, several prominent nuclei, and a narrow cytoplasm to moderately that partially contained melanin (black circle).

Figure 4. Surgical procedure on the patient. (A) Area marking of the lesion and anesthesia injection. (B) Lesion excision. (C) Flap procedure. (D) Wound healing. (E) End result.

Figure 6. The progression of the surgical wound. (A). Lesion after surgery; (B). Day four after surgery; (C). Day eight after surgery and 26 sutures removal; (D). Day 11 after surgery and six sutures removal; (E). Day 24 after surgery.
**CASE REPORT**

Histopathology examination from the post-surgery lesion showed a section of tissue covered by the epidermis layer that is partially ulcerated. The proliferation of anaplastic basal cells was seen: relatively monotonous rounded nucleus, coarse chromatin, several prominent nuclei, narrow cytoplasm to moderately that partially contained melanin. There was a gap between the tumor (cleft) with stroma between the keratin material. The tumor distance to the base of the lesion was less than 1 mm, the tumor distance to the right margin was 8 mm, the tumor distance to the left margin was 8 mm, the tumor distance to the inferior margin was 4 mm, the superior margin of resection is free of tumor cells. The histopathological conclusion was BCC nodular or nodulocystic type, and the margin resection on the superior, inferior, dextra, and sinistra was free of tumor cells. Tumor-to-base distance was less than 1 mm. From the second histopathology, we assessed the patient with pigmented BCC, and all the edges of the surgical margin were free of malignant cells (Figure 5).

After the surgical excision, we treated the patient with Cefixime 2x100 mg for seven days, Mefenamic acid 3x500 mg if needed (only if there is pain), and Tranexamic acid 3x500 mg for three days to stop the bleeding. Natrium fusidat cream and wet dressing NaCl 0.9% were given every time the patient had wound until the wound healed. Three days after the surgery, there was a clinical improvement in the surgery, and there was no sign of inflammation or infection. The patient's progress notes are shown in Figure 6.

**DISCUSSION**

Skin cancer ranks as the most prevalent type of cancer globally, with basal cell carcinoma (BCC) typically representing 75–80% of cases originating from the basal layer of the epidermis and its appendages. The incidence of BCC has tripled in the past three decades, notably showing a significant surge among younger individuals and women. In Europe, the annual growth rate of BCC has been around 5% in recent decades. In the United States, there has been a 2% annual increase in the incidence rate, leading to approximately 2–5 million BCC patients receiving treatment each year. While the incidence of BCC in the Asian population is considerably lower (10- to 100-fold) compared to Western countries, there has been a notable increase in cases in recent times. Despite the relatively low mortality of BCC, its impact on morbidity is considerable due to its locally destructive spread. Instances of metastatic disease or fatalities attributable to BCC are rare. However, the aggressive local expansion of the tumor can result in significant morbidity.5,6

BCC typically occurs more frequently in the elderly; however, there is a growing trend of its occurrence in individuals under 50 years of age. Christenson and colleagues observed a particularly notable rise in BCC cases among women under the age of 40. While men are slightly more affected than women, the prevalence of basal cell carcinoma increases in individuals aged over 60, with 57% of cases observed in men. The predominant site for the vast majority of BCCs is the head and neck area.4

Numerous risk factors contribute to the onset of BCC, with one of the most prominent being exposure to UV radiation from the sun. Individuals with white skin, light hair, and light eye color are particularly susceptible to BCC due to their heightened vulnerability to UV radiation, making these factors independent risk contributors. The relationship between sun exposure and BCC development is intricate and relies on the timing, pattern, and quantity of UV exposure. Notably, the risk of BCC development increases significantly with sun exposure during childhood and adolescence in comparison to exposure during later stages of life.4 Other risk factors encompass age, skin phototype (especially Fitzpatrick skin phototype I and II), gender, pharmacological therapy, radiation therapy, family history of skin tumors, prolonged arsenic exposure, immunosuppression, and various genetic factor syndromes. Additionally, some studies indicate that a lower socioeconomic status is associated with a higher likelihood of developing BCC.8

Prolonged exposure to sunlight stands as a crucial risk factor for the development of BCC. Typically, there is a diagnostic delay of approximately 15 to 20 years from the time of UV damage to clinical onset in BCC cases. UV radiation contributes to BCC formation through direct DNA damage, indirect DNA damage via reactive oxygen species, and immune suppression. Melanin absorption of UVA leads to indirect DNA damage through free radicals, while UVB directly damages DNA and RNA, characterized by C/T or CC/TT transitions. Ultraviolet exposure also induces a dose-dependent suppression of the cutaneous immune system, diminishing immune surveillance of skin cancer. A population-based case-control study in Alberta, Canada, highlighted an elevated risk associated with recreational sun exposure during childhood and adolescence, emphasizing the potential critical role of these life periods in establishing adult susceptibility to BCC. This association was particularly significant among individuals with sun sensitivity, displaying a tendency to burn rather than tan. Other studies have concurred that intermittent, intense sun exposure appears to heighten the risk, whereas cumulative, long-term UV exposure does not show the same correlation.10

This patient has been a farmer since he was 20 years old. The patients were exposed to the sun for more than two hours per day without any sun protection, indicating high sun exposure without any protection from UV radiation. The patient is also aged 80 and has had a high accumulation of sun exposure during his life. The significant accumulation of sun exposure emerges as a pertinent risk factor contributing to the heightened occurrence of BCC in this individual.

The identification of basal cell carcinoma hinges on scrutinizing the lesion clinically and subsequently validating it through histopathological examination. Non-invasive techniques like dermoscopy and reflectance confocal microscopy serve to augment diagnostic precision in tandem with clinical assessments. A systematic assessment comparing the efficacy of unaided visual inspection and dermoscopy demonstrated an increase in sensitivity from 66.9% to 85%, and specificity rose from 97.2%
to 98.2%. The collective sensitivity and specificity of dermoscopy in diagnosing basal cell carcinoma were calculated at 91.2% and 95%, respectively. Heightened sensitivity was evident when dermoscopy was conducted by seasoned practitioners, particularly through direct, in-person evaluations rather than relying on dermoscopic photographs. Dermoscopy proves most valuable in discerning basal cell carcinoma from melanoma, squamous cell carcinoma (SCC), encompassing Bowen’s disease, and benign tumors.11,12

Originating in sun-damaged skin, basal cell carcinomas manifest in diverse manners both clinically and histopathologically. Patients frequently report an expanding, non-healing lesion that might occasionally undergo bleeding. Pruritus could also be a documented symptom, or patients might remain entirely asymptomatic. The primary inclination is observed in the head and neck regions, specifically, those extensively exposed to sunlight, although incidents can transpire anywhere on the body. Nevertheless, the significance of anatomical location is underscored, with the central face recognized as a zone with a heightened risk for potential recurrences.4,13

The various clinical features of BCC are the result of various combinations of histologic subtypes. The five most frequent histologic subtypes of BCC are nodular (21%), superficial (17%), micronodular (15%), infiltrative (7%), and morpheaform or sclerosing (1%). Several studies also reported a mixed pattern (2 or more histologic patterns) appearing in 38.5% of BCC.13 In this patient, he had a complaint of a lump that got bigger over time. In the middle of the lump, there was an ulceration that was never healed, even though he gave any kind of medication and a sign of telangiectasia. The edges of the lump also showed a rolled border, a typical clinical presentation for BCC, and a hyperpigmented translucent nodule on one of the edges of the lesion. The location of the lump was in his right forehead, which is one of the most common predilections of sun exposure, and it is near the high-risk area for recurrences of BCC.

The dermoscopic configuration of basal cell carcinoma is categorized into three divisions, encompassing vascular structures, pigment-related structures, and non-vascular/non-pigmented structures. Vascular structures consist of arborizing vessels and superficial fine telangiectasias (SFT), while pigment-associated structures involve features like maple-leaf-like areas, spoke-wheel areas, multiple blue-gray nests and dots/globules, in-focus dots, and concentric structures. Nonvascular/ non-pigmented structures encompass ulceration, multiple small erosions, white-red structureless areas, and shiny white lines/white streaks.14,15

In this case, the dermoscopic examination of the lesion showed an absence of pigment network. There was a blue-gray ovoid nest, a shiny white structureless area, arborizing vessels, and ulceration. Dermoscopy examination results indicate a BCC diagnosis.

Pigmented basal cell carcinoma represents a variant of nodular basal cell carcinoma characterized by heightened melanization. It presents as a hyperpigmented, translucent papule. Differential diagnosis involves distinguishing it from nodular melanoma and seborrheic keratosis. While approximately 75% of basal cell carcinomas contain melanocytes, only 25% exhibit substantial melanin content. Histological examination reveals clusters of basaloid cells, an abundance of melanin and melanophages, along with a moderate inflammatory infiltrate. The melanocytes are situated amidst tumor nests, while melanophages are distributed within the stroma.4,16

In this case, on the clinical examination, there was a hyperpigmented translucent nodule with an ulceration in the center of the nodule. Telangiectasia and rolled border were also present. Its clinical appearance represented nodular BCC. Both histopathological examinations showed a diagnosis for BCC, and its subtype was pigmented BCC because of the presence of melanin from the second histopathological result.

The paramount objective in treating localized basal cell carcinoma is the comprehensive removal of the skin tumor while safeguarding both cosmetic and functional considerations. Consequently, surgery emerges as the predominant approach for localized basal cell carcinoma treatment. Surgery, including Mohs micrographic surgery, stands as the gold standard in managing basal cell carcinoma. According to the Cochrane Collaboration, surgery is identified as the most effective treatment for basal cell carcinoma, yielding the best overall outcomes.14

The most effective treatment for basal cell carcinoma involves surgical excision, ensuring the complete removal of the lesion either by incorporating safety margins or through micrographic control. The primary objective is to hinder tumor progression or recurrence, as these could lead to additional tissue damage. However, there are instances where the microscopic extension of the tumor may extend beyond the apparent clinical boundaries. Hence, surgical interventions aim to eliminate both the visibly affected tumor and its microscopic extensions into the neighboring, seemingly normal skin. This is accomplished by excising the tumor along with a margin of skin that appears clinically normal. Recognizing that subdermal adipose tissue exhibits resistance to spreading, and it becomes crucial to excise basal cell carcinoma down to the level of subdermal adipose tissue.17

In this case, the patient was treated using surgical excision. The surgical margin of the lesion was 5 mm, and the lesion was taken up to the adipose tissue layer. The second histopathological result (after surgical excision) showed no malignant cells were found at the end of each edge of the surgical incision. MMS cannot be performed at our facility. Surgical excision of the lesion is the best option.

The objectives of treating basal cell carcinoma encompass complete removal of the tumor, maximal preservation of function, and achieving a satisfactory cosmetic outcome. The face stands out as one of the most commonly affected areas by skin tumors. The defects resulting from tumor removal can exhibit various patterns contingent upon the size and location of the lesion. An ideal reconstruction on the face should ensure a harmonious color and texture match with the surrounding tissues. For addressing defects on the forehead and cheek, local flaps are the preferred choice. However, the application of local flaps is frequently restricted by
factors such as tissue availability and defect size. Consequently, larger defects are optimally managed with regional or distant flaps. A combination of flaps can be a viable option for repairing complex defects.18

The cosmetic significance of facial defect reconstruction necessitates careful attention. In cases of smaller defects, primary closure is commonly utilized to maintain consistent skin color, texture, and thickness, although it carries the risk of anatomical structure distortion. Alternatively, the use of skin grafts is considered for defect closure, with potential concerns arising from a suboptimal color match at the recipient site, particularly noteworthy in the Asian population.18

Forehead reconstruction entails achieving specific objectives, including the preservation of brow symmetry, the maintenance of natural frontal and temporal hairlines, and the discreet concealment of scars within hairlines, eyebrows, or facial rhytids when possible.19

The lateral forehead constitutes one of the aesthetic units within the forehead, extending laterally from the mid pupil to the eyebrows, with its superior boundary defined by the scalp, lateral boundary by the temple, and inferior boundary by the eyebrow. For defects in this region, donor flap areas are sourced from the temple and/or the paramedian forehead area. Reconstruction goals in this area involve ensuring the symmetric positioning of the eyebrow, placing the scar within the hairline, and preserving the natural placement of the temple.20

Defined as incised flaps, advancement flaps induce unidirectional movement to cover an existing defect resulting from excision or prior trauma.19 This method is conceptually the most straightforward among all flap repairs. Typically, the associated tissue movement involves a simple, unidirectional advancement of the flap’s leading edge. It is noteworthy that advancement flaps generally do not mobilize much additional tissue laxity, and the tension vector of the flap repair remains aligned with the primary motion of the flap. Consequently, unlike rotation and transposition flaps, advancement flaps lack the advantage of redirecting wound closure tension to a more favorable axis.21

Recommended for forehead reconstruction, the types of advancement flaps include unilateral, bilateral, and island advancement flaps. The objective when addressing defects near the hairline or eyebrow is to close the defect without altering the brow line or hairline. The primary flap used in this region is the A-T or O-T flap, with the horizontal incision placed parallel to the hair margin.22 This flap presents the advantage of incorporating a vertical scar in the forehead while aligning the horizontal incisions along the eyebrow. Any disparity in flap lengths can often be managed through differential suturing. If dog ears need excision, it is advisable to position them inferiorly in the glabellar region or at the lateral extremity to conceal the scar within the glabellar frown lines and crow’s feet, respectively. Accurate orientation of the horizontal skin creases is crucial.23–26

In this case, the facial reconstruction uses a unilateral advancement flap with A-T plasty technique. Considering the place of the lesion on the forehead, the A-T flap was the simplest and best option for this patient’s reconstruction. This patient is also an elderly man who had a decrease in skin laxity due to the aging process and abundant exposure to UV.

CONCLUSION

We reported a case of a 70-year-old man with a main complaint of a wound on his forehead since two years ago and was later diagnosed with pigmented BCC. Surgical excision with advancement flap reconstruction was conducted in this patient with a satisfactory improvement and healing after three weeks post-surgery.

CONFLICT OF INTEREST

There was no conflict of interest.

FUNDING

Not Applicable.

AUTHOR CONTRIBUTIONS

Writing-review and editing, B.K.N; Writing-Original draft preparation, B.K.N, D., and I.Y; Guidance on manuscript consultation and case discussion, R.D; case discussion and therapy selection, M.Y.L, I.C, B.H.K, and M.S.

ETHICAL CONSIDERATION

A subject voluntarily consented to the study’s publication, understanding that the patient’s identity would remain private. ICMJE (International Committee of Medical Journal Editors) ethics approval has been obtained.

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